FROEHLING & ROBERTSON, INC.
Engineering Stability Since 1881

310 Hubert Street
Raleigh, North Carolina 27603-2302
T 919.828.3441 I F 919.828.5751
NC License #F-0266

October 13, 2017 (revised February 5, 2018)

North Carolina Department of Transportation
Geotechnical Engineering Unit
1020 Birch Ridge Drive
Raleigh, North Carolina 27610

Attn.: Mr. Gordon Box, L.G.
GeoEnvironmental Project Manager

Re: State Project: R-2530B
WBS Element: 34446.1.6
NC 24-27 from Bird Road in Albemarle to West of the Pee Dee River

Subject: **Preliminary Site Assessment**
Parcel #046 – Walter T. and Sharon Tarlton (Flagstone Realty)
2210 East Main Street
Albemarle, North Carolina
F&R Project #66V-0092

Dear Mr. Box:

Froehling and Robertson, Inc. (F&R) has completed the authorized Preliminary Site Assessment at the Walter T. and Sharon Tarlton property located in Albemarle, North Carolina. The work was performed in general accordance with F&R's Proposal No. 1866-00132, dated June 14, 2017 (and revised June 22, 2017). Notice to Proceed was issued to F&R on July 6, 2017. This report documents our field activities, presents the results of laboratory analysis and provides estimated quantities of petroleum impacted soils. Please do not hesitate to contact us if you should have any questions regarding this report.

Sincerely,

FROEHLING & ROBERTSON, INC.

DocuSigned by:
4DB7F275EBFD410...

DocuSigned by:
Benjamin A. Whitley
E425D6E8C2354E...

NORTH CAROLINA PROFESSIONAL SEAL 038743 ENGINEER BENJAMIN A. WHITLEY

Clint E. Sorrell
Environmental Scientist

Benjamin A. Whitley, P.E.
GeoEnvironmental Services Manager

FROEHLING & ROBERTSON, INC.

PRELIMINARY SITE ASSESSMENT

Walter T. and Sharon Tarlton (Parcel #046)
Flagstone Realty
2210 East Main Street
Albemarle, North Carolina
State Project: R-2530B
WBS Element: 34446.1.6
F&R Project #66V-0092

October 13, 2017 (revised February 5, 2018)

Prepared for:

North Carolina Department of Transportation
Geotechnical Engineering Unit
1020 Birch Ridge Drive
Raleigh, NC 27610

TABLE OF CONTENTS

PAGE

Preliminary Site Assessment Report
Walter T. and Sharon Tarlton Property (Parcel #046)
Albemarle, Stanly County, North Carolina
F&R Project No. 66V-0092

1.0 Introduction

Froehling and Robertson, Inc. (F&R) has prepared this Preliminary Site Assessment (PSA) Report to document soil assessment activities performed at the Walter T. and Sharon Tarlton Property addressed as 2210 East Main Street, in Albemarle, Stanly County, North Carolina. The site is located approximately 500 feet west of the East Main Street and Anderson Grove Church Road intersection as shown in Appendix I, Figures 1 and 2. As indicated in the Request for Technical and Cost Proposal (RFTCP), the site operates as an office store front. According to the NCDEQ UST Section Registry, the site has not been assigned a Facility Identification number. The RFTCP indicates a UST heating oil tank was observed on the east side of the building.

According to the NCDOT within their RFTCP, acquisition of right-of-way is necessary for the proposed NC 24-27 design. As such, the NCDOT requested a PSA be performed to assess the possibility of encountering petroleum impacted soil from known or unknown USTs, and to locate USTs which may exist within proposed easement sand right-of-way at the project site.

The PSA was performed in general accordance with F&R's Proposal No. 1866-00132, dated June 14, 2017 (and revised June 22, 2017) with Notice to Proceed issued to F&R by the NCDOT on July 6, 2017. The purpose of this report is to document field activities, present the results of laboratory analysis, and provide estimated quantities of petroleum impacted soils.

The existing on-site structure is one-story in height and appears to be constructed of brick and concrete masonry unit (CMU) block. The remainder of the site consists of an asphalt paved parking lot and cleared land. The site is bordered to the north by East Main Street; to the south by cleared and wooded land; to the east by a storage and tool shop; and to the west by scattered residential development. Access to the site is gained from East Main Street to the north.

2.0 Geophysical Survey

Prior to F&R's soil assessment activities, Pyramid Environmental & Engineering, P.C. (Pyramid) conducted a geophysical survey to locate suspect metal underground storage tanks (USTs). The geophysical work was conducted from July 21 to July 24, 2017, and was performed within the proposed utility easement (PUE) of East Main Street.

The geophysical investigation consisted of electromagnetic (EM) induction surveys using a Geonics EM61 instrument. Ground-penetrating radar (GPR) investigations of selected EM61 anomalies were investigated using a Geophysical Survey Systems UtilityScan DF unit equipped with a dual frequency 300/800 MHz antenna. The EM61 data was collected along parallel survey lines spaced approximately 5 feet apart. The data was reviewed in the field to evaluate the possible presence of USTs and later transferred to a desktop computer for further review. Data was collected over most of the planned survey site with the exception of areas immediately adjacent to metallic objects and other obstacles. Isolated EM anomalies were identified on the site, including a building, vehicles, utility cover, and foundation.

Based on the EM and GPR geophysical data collected at the site, Pyramid observed two anomalies that were interpreted to be the result of one probable and one possible metallic UST within about 2 to 2.5 feet of the ground surface. It should be noted that the probable metallic UST is located beyond the PUE. The complete geophysical report is attached as Appendix II.

3.0 Site Assessment Activities

F&R visited the site on August 10 and 17, 2017 to perform the Preliminary Site Assessment. The assessment consisted of advancing 4 borings into the soils at the project site using direct-push technology (Geoprobe). The boring locations were determined by F&R staff based on the results of the geophysical survey, site features and proposed construction activities. Two of the borings (B-1 and B-2) were advanced on the northern portion of the site, adjacent to East Main Street. Borings B-3 through B-4 were advanced on the eastern portion of the site, adjacent to the possible metallic UST. F&R notes the probable UST is located beyond the proposed utility easement (PUE). Therefore, borings were not advanced adjacent to Probable UST #1. F&R attempted to advance the borings adjacent to East Main Street (B-1 and B-2) to the proposed depth of 10 feet below ground surface (bgs) and the borings around the USTs to the proposed depth of 12 feet bgs. However, Borings B-1 through B-4 were terminated at depths ranging from 6.5 to 7 feet bgs, where GeoProbe refusal was encountered. Photos detailing existing site features are attached as Appendix III and boring locations are depicted in Figure 3 of this report.

Soil sample cores from the borings were collected in disposable, 4-foot long acetate sleeves. The soil samples were visually/manually classified and screened in the field using a calibrated photo-ionization detector (PID) for evidence of petroleum hydrocarbons. Evaluation of VOC concentrations were performed using a MiniRae 3000 PID which produces results in parts per million (ppm). A representative soil sample was collected from two foot sections of each sleeve

and placed in a re-sealable plastic bag. The vapors were then allowed to equilibrate in the headspace of the bag for approximately ten minutes prior to measurement with the PID. The measurements were collected by placing the probe tip into the headspace of the bag. PID measurements can be found in the Geoprobe Logs in Appendix IV, as well as in Table 1 in Section 5.0 below.

Generally, the soil sample in each boring which exhibited the highest PID concentration was submitted for laboratory analysis for diesel range organics (DRO), gasoline range organics (GRO), Total BTEX (benzene, toluene, ethylbenzene and xylenes), 16 PAHs (polycyclic aromatic hydrocarbons) and BaP (Benzo(a)pyrene) by Ultraviolet Fluorescence (UVF) technology (RedLab QED Hydrocarbon Analyzer).

The samples were collected in laboratory-supplied sample containers, placed in a cooler with ice, and shipped via UPS to RedLab in Wilmington, North Carolina following standard chain-of custody procedures.

4.0 Subsurface Conditions

As indicated in the attached Geoprobe Logs (Appendix IV), subsurface conditions from existing ground surface to boring termination primarily included various layers of dry to moist, orange-brown silty sandy clay, and dry tan silty clay with brick debris. F&R attempted to advance the borings adjacent to East Main Street (B-1 and B-2) to the proposed depth of 10 feet below ground surface (bgs) and the borings around the USTs to the proposed depth of 12 feet bgs. However, Borings B-1 through B-4 were terminated at depths ranging from 6.5 to 7 feet bgs, where Geoprobe refusal was encountered due to dense silt and/or brick debris.

PID readings generally did not exceed 3.9 ppm, and petroleum odors and/or groundwater were not observed during field screening or sample collection activities.

5.0 Analytical Results

As shown in the following table, petroleum hydrocarbons identified as GRO were encountered in the soil sample at one boring location advanced at the site (B-2), at a depth from 0-2 feet bgs. The laboratory results indicate that the GRO concentration was 2.6 mg/kg, which is below the UST Section Action Level of 50 mg/kg.

Petroleum hydrocarbons identified as DRO were encountered in the soil samples at two boring locations advanced at the site (B-1 and B-2), at depths from 0 to 2 feet bgs (B-2) to 4 to 6.5 feet bgs (B-1). The laboratory results indicate that the DRO concentrations ranged from 3.7 mg/kg

(B-1) to 16.6 mg/kg (B-2), which is below the UST Section Action Level of 100 mg/kg. The soil analytical results are summarized in Table 1 below. The laboratory analytical results can also be found in the attached Appendix V of this report.

Table 1
Soil Sampling Analytical Results

Sample ID	Sample Date	Sample Depth (ft bgs)	PID Reading (ppm)	GRO (mg/kg)	DRO (mg/kg)	TPH (mg/kg)	Total BTEX (mg/kg)	Total Aromatics (mg/kg)	16 EPA PAHs (mg/kg)	BaP (mg/kg)
B-1	8/10/17	4-6.5	2.6	<1.2	3.7	3.7	<1.2	1.7	<0.38	<0.047
B-2		0-2	3.9	2.6	16.6	19.2	<1.2	9.1	<0.39	<0.049
B-3	8/17/17	2-4	3.6	<0.52	<0.52	<0.52	<0.52	<0.1	<0.17	<0.021
B-4		0-2	3.1	<0.53	<0.53	<0.53	<0.53	<0.11	<0.17	<0.021
NCDEQ Action Level				**50**	**100**	**NSE**	**13.8056**	**NSE**	**9,068.816**	**0.088**

Concentrations shown in bold exceed the NCDEQ Action Level as outlined in the NCDEQ, DWM, UST Section Guidelines
BTEX concentrations shown in bold exceed the total Soil-to-Water MSCC Level for those compounds
ppm = parts per million
GRO = Gasoline Range Organics
DRO = Diesel Range Organics
TPH = Total Petroleum Hydrocarbons
BTEX = Benzene, Toluene, Ethylbenzene and Xylenes
NSE = No Standard Exists

6.0 Conclusions and Recommendations

F&R conducted a PSA at the Walter T. and Sharon Tarlton Property addressed as 2210 East Main Street, in Albemarle, Stanly County, North Carolina. A geophysical investigation was performed by Pyramid Environmental & Engineering to investigate the presence and location of USTs in the proposed right-of-way. Based on the results of the geophysical survey, it was determined that one probable metallic UST and one possible metallic UST was present on the eastern portion of the site, adjacent to the on-site building. It should be noted that the probable metallic UST is located beyond the PUE. F&R recommends that USTs removed from the project site be properly managed and disposed of in accordance with NCDEQ rules and regulations.

Four Geoprobe borings were advanced during the assessment within the PUE, where grading activities are proposed in association with the NC 24-27 improvements. Based on the results of laboratory testing and observed PID readings, petroleum impacted soils were encountered in the vicinity of boring locations B-1 and B-2. Laboratory analysis detected concentrations of DRO at these locations, as well as GRO at boring location B-2; however, the concentrations of these compounds were below the NCDEQ Action Levels of 100 mg/kg DRO and 50 mg/kg GRO.

It should be noted that a delineation of the soil contamination was not performed, as this was not included in the proposed scope of work. The above conclusions are based on interpretations of soil analytical results, PID readings and our experience with petroleum UST releases.

7.0 Limitations

These services have been performed, under authorization of the North Carolina Department of Transportation for specific application on this project. These services have been performed in accordance with generally accepted environmental and hydrogeological practices. No other warranty, expressed or implied is made. As with any subsurface investigation, actual conditions exist only at the precise locations from which samples were taken. Certain inferences are based on the results of sampling and related testing to form a professional opinion of conditions in areas beyond those from which samples were taken. Our conclusions and recommendations are based upon information provided to us by others, our sampling and testing results and our site observations. We have not verified the completeness or accuracy of the information provided by others, unless otherwise noted. Our observations are based upon conditions readily visible at the site at the time of our site visits.

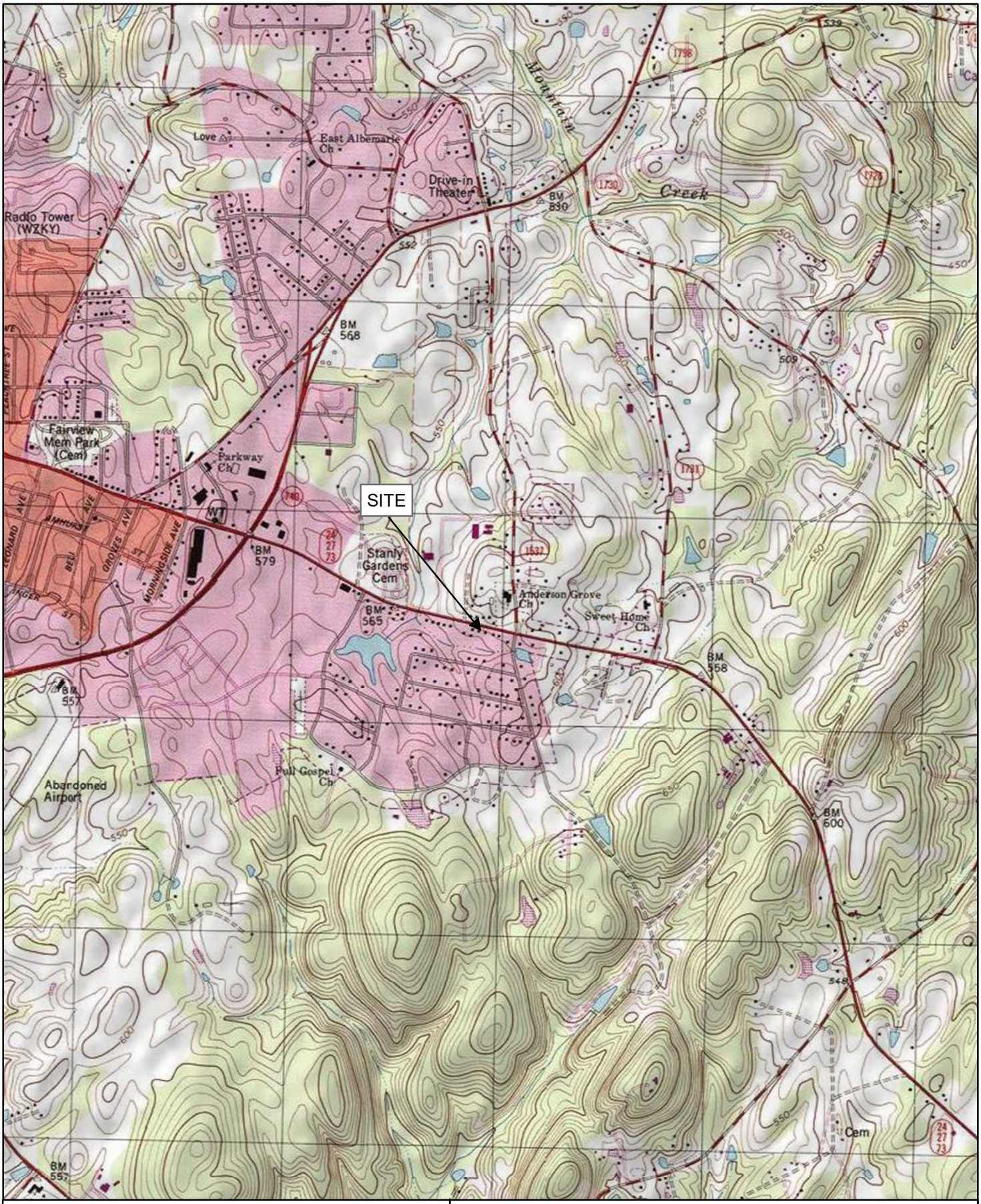
Froehling & Robertson, Inc. by virtue of providing the services described in this report, does not assume the responsibility of the person(s) in charge of the site, or otherwise undertake responsibility for reporting to any local, state or federal public agencies any conditions at the site that may present a potential danger to public health, safety or the environment. In areas that require notification of local, state, or federal public agencies as required by law, it is the Client's responsibility to so notify.

APPENDIX I

Figure No. 1 – TOPOGRAPHIC MAP

Figure No. 2 – SITE VICINITY MAP

Figure No. 3 – LABORATORY RESULTS & BORING LOCATION PLAN



SITE TOPOGRAPHIC MAP

0 1,000 2,000 4,000 6,000 Feet

FROEHLING & ROBERTSON, INC.
Engineering Stability Since 1881
310 Hubert Street
Raleigh, North Carolina 27603-2302 I USA
T 919.828.3441 I F 919.828.5751

Client:	NCDOT
Project:	R-2530B PSAs
Location:	Parcel #046, Albemarle, NC
F&R Project No.:	66V-0092 2210 East Main Street - Albemarle, North Carolina
Data:	USGS 2013
Date:	October 2017 (Revised Feb. 5, 2018) Scale: 1:24,000 1 inch = 2,000 feet

Disclaimer: F&R makes no warranties or guarantees regarding the accuracy or completeness of geographic features shown on this map. Spatial accuracy of measurement provided by source agencies can be obtained by contacting F&R.

FIGURE No.: 1

SITE VICINITY MAP

0 100 200 400 600 Feet

N

FROEHLING & ROBERTSON, INC.
Engineering Stability Since 1881
310 Hubert Street
Raleigh, North Carolina 27603-2302 I USA
T 919.828.3441 I F 919.828.5751

Client:	NCDOT
Project:	R-2530B PSAs
Location:	Parcel #046, Albemarle, NC
F&R Project No.:	66V-0092
Data:	ArcMap Imagery
Date:	October 2017 (Revised Feb. 5, 2018)

Disclaimer: F&R makes no warranties or guarantees regarding the accuracy or completeness of geographic features shown on this map. Spatial accuracy of measurement provided by source agencies can be obtained by contacting F&R.

2210 East Main Street - Albemarle, North Carolina

Scale: 1:2,400 1 inch = 200 feet

FIGURE No.: 2

B-2: 0.0'-2.0'
GRO=2.6 mg/kg
DRO=16.6 mg/kg
TOTAL BTEX=<1.2 mg/kg
TOTAL AROMATICS=9.1 mg/kg
16 EPA PAHs=<0.39 mg/kg
BaP=<0.049 mg/kg

B-1: 4.0'-6.5'
GRO=<1.2 mg/kg
DRO=3.7 mg/kg
TOTAL BTEX=<1.2 mg/kg
TOTAL AROMATICS=1.7 mg/kg
16 EPA PAHs=<0.38 mg/kg
BaP=<0.047 mg/kg

B-3: 6.0'-7.0'
GRO=<0.52 mg/kg
DRO=<0.52 mg/kg
TOTAL BTEX=<0.52 mg/kg
TOTAL AROMATICS=<0.1 mg/kg
16 EPA PAHs=<0.17 mg/kg
BaP=<0.021 mg/kg

B-4: 4.0'-6.0'
GRO=<0.53 mg/kg
DRO=<0.53 mg/kg
TOTAL BTEX=<0.53 mg/kg
TOTAL AROMATICS=<0.11 mg/kg
16 EPA PAHs=<0.17 mg/kg
BaP=<0.021 mg/kg

NC GRID NAD 83'95

6" CONC CURB
NC 24/27/73 (E. Main St.)
U/G JUNCT
NOT VIS
(APPROX. LO
10" DIP
BST
CONC
GR
W/LT
FLAG POLE
ISBLK BUS
ISBLKBUS
ISBK& FBUS
DUE
PUE
PDE
CONC
GARY L & LOU L WHITLEY SR

POSSIBLE UST NO. 1
APPROX. UST DIMENSIONS
5' Dia. x 8' L x 2' D

PROBABLE UST NO. 1
APPROX. UST DIMENSIONS
5' Dia. x 8' L x 2.5' D

SCALE (FEET)
0 15' 30'
1"=30'

SINCE 1881
FROEHLING & ROBERTSON, INC.
Engineering Stability Since 1881
310 Hubert Street
Raleigh, North Carolina 27603-2302|USA
T 919.828.3441|F 919.828.5751
www.fandr.com

LEGEND

Approximate Geoprobe Boring Location

Sample data shown in bold exceed the NCDEQ Action Level as outlined in the NCDEQ DWM UST Section Guidance

LABORATORY RESULTS & BORING LOCATION PLAN

CLIENT: NCDOT	
PROJECT: R-2530B PSAs	
LOCATION: Albemarle, NC Parcel #046, 2210 East Main Street	
F&R PROJECT No.: 66V-0092	
DRAWN BY: T. T. Walker	CHECKED BY: B. Whitley, P.E.
DATE: February 2018	SCALE: 1"=30'

FIGURE No.: 3

APPENDIX II

GEOPHYSICAL REPORT PREPARED BY PYRAMID

PYRAMID GEOPHYSICAL SERVICES
(PROJECT 2017-203)

GEOPHYSICAL SURVEY

METALLIC UST INVESTIGATION:
PARCEL 046
NCDOT PROJECT R-2530B

2210 E. MAIN STREET, ALBEMARLE, NC

AUGUST 28, 2017

Report prepared for:

Benjamin Whitley, P.E.
Froehling and Robertson
310 Hubert Street
Raleigh, North Carolina 27603

Prepared by: _____

Eric C. Cross, P.G.
NC License #2181

Reviewed by: _____

Douglas A. Canavello, P.G.
NC License #1066

503 INDUSTRIAL AVENUE, GREENSBORO, NC 27406
P: 336.335.3174 F: 336.691.0648
C257: GEOLOGY C1251: ENGINEERING

GEOPHYSICAL INVESTIGATION REPORT
Parcel 046 – 2210 E. Main Street
Albemarle, Stanly County, North Carolina

Table of Contents

Figures

LIST OF ACRONYMS

CADD .....Computer Assisted Drafting and Design
DF .....Dual Frequency
EM.....Electromagnetic
GPR.....Ground Penetrating Radar
GPS .....Global Positioning System
NCDOT.....North Carolina Department of Transportation
ROW .....Right-of-Way
UST .....Underground Storage Tank

EXECUTIVE SUMMARY

Project Description: Pyramid Environmental conducted a geophysical investigation for Froehling and Robertson, Inc. (F&R) at Parcel 046, located at 2210 E. Main Street, Albemarle, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project R-2530B). F&R directed Pyramid as to the geophysical survey boundaries at the project site, which were designed to extend from the existing edge of pavement to the proposed ROW lines and/or easement lines within the property, whichever distance was greater. Conducted from July 21-24, 2017, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

Geophysical Results: Several of the EM anomalies were directly attributed to visible cultural features at the ground surface. A suspected vent pipe was observed on the east side of the building. Two EM features on the east side of the survey area were associated with unknown buried metal, and were investigated further by GPR. One of these features correlated to the location of the suspected vent pipe. One EM feature was observed on the west side of the building that was not readily attributed to any visible cultural features, and was also investigated with GPR.

At the location of the suspected vent pipe, GPR provided evidence of an isolated hyperbolic reflector and discreet lateral reflector that are characteristic of a UST. The combined geophysical data resulted in this feature being classified as one probable metallic UST (center point 1656062.74, 582531.55 North Carolina State Plane NAD83, feet). The probable metallic UST was approximately 8 feet long and 5 feet wide at a depth of approximately 2.5 feet below the ground surface. A second isolated hyperbolic reflector and discreet lateral reflector were observed directly north of the probable UST. The combined geophysical data at this location resulted in this feature being classified as one possible metallic UST (center point 1656068.88, 582550.15 North Carolina State Plane NAD83, feet). The possible metallic UST was approximately 8 feet long and 5 feet wide at a depth of approximately 2.0 feet below the ground surface.

GPR performed across the west side of the building did not record any evidence of additional USTs.

Collectively, the geophysical data recorded evidence of one probable and one possible metallic UST at Parcel 046.

INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for Froehling and Robertson, Inc. (F&R) at Parcel 046, located at 2210 E. Main Street, Albemarle, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project R-2530B). F&R directed Pyramid as to the geophysical survey boundaries at the project site, which were designed to extend from the existing edge of pavement to the proposed ROW lines and/or easement lines within the property, whichever distance was greater. Conducted from July 21-24, 2017, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

The site included a commercial building surrounded by an asphalt parking area and grass medians. A possible vent pipe was observed protruding from the ground on the east side of the building. An aerial photograph showing the survey area boundaries and ground-level photographs are shown in **Figure 1**.

FIELD METHODOLOGY

The geophysical investigation consisted of an electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. Pyramid collected the EM data using a Geonics EM61 metal detector integrated with a Trimble AG-114 GPS antenna. The integrated GPS system allows the location of the instrument to be recorded in real-time during data collection, resulting in an EM data set that is geo-referenced and can be overlain on aerial photographs and CADD drawings. A boundary grid was established around the perimeter of the site with marks every 10 feet to maintain orientation of the instrument throughout the survey and assure complete coverage of the area.

According to the instrument specifications, the EM61 can detect a metal drum down to a maximum depth of approximately 8 feet. Smaller objects (1-foot or less in size) can be detected to a maximum depth of 4 to 5 feet. The EM61 data were digitally collected at

approximately 0.8-foot intervals along north-south trending or east-west trending, generally parallel survey lines, spaced five feet apart. The data were downloaded to a computer and reviewed in the field and office using the Geonics NAV61 and Surfer for Windows Version 14.0 software programs.

GPR data were acquired across select EM anomalies on July 24, 2017, using a Geophysical Survey Systems, Inc. (GSSI) UtilityScan DF unit equipped with a dual frequency 300/800 MHz antenna. Data were collected both in reconnaissance fashion as well as along formal transect lines across EM features. The GPR data were viewed in real-time using a vertical scan of 512 samples, at a rate of 48 scans per second. GPR data were viewed down to a maximum depth of approximately 6 feet, based on dielectric constants calculated by the DF unit in the field during the reconnaissance scans. GPR transects across specific anomalies were saved to the hard drive of the DF unit for post-processing and figure generation.

Pyramid's classifications of USTs for the purposes of this report are based directly on the geophysical UST ratings provided by the NCDOT. These ratings are as follows:

Geophysical Surveys for Underground Storage Tanks
on NCDOT Projects

High Confidence	Intermediate Confidence	Low Confidence	No Confidence
Known UST Active tank - spatial location, orientation, and approximate depth determined by geophysics.	**Probable UST** Sufficient geophysical data from both magnetic and radar surveys that is characteristic of a tank. Interpretation may be supported by physical evidence such as fill/vent pipe, metal cover plate, asphalt/concrete patch, etc.	**Possible UST** Sufficient geophysical data from either magnetic or radar surveys that is characteristic of a tank. Additional data is not sufficient enough to confirm or deny the presence of a UST.	Anomaly noted but not characteristic of a UST. Should be noted in the text and may be called out in the figures at the geophysicist's discretion.

DISCUSSION OF RESULTS

Discussion of EM Results

A contour plot of the EM61 results obtained across the survey area at the property is presented in **Figure 2**. Each EM anomaly is numbered for reference in the figure. The following table presents the list of EM anomalies and the cause of the metallic response, if known:

LIST OF METALLIC ANOMALIES IDENTIFIED BY EM SURVEY

Metallic Anomaly #	Cause of Anomaly	Investigated with GPR
1	Building/utility	☑
2	Vehicle	
3	Utility cover	
4	Building foundation	
5	**One possible UST**	☑
6	**One probable UST**	☑

Several of the EM anomalies were directly attributed to visible cultural features including a vehicle, metal utility covers, and the building foundation. However, EM Anomalies 1, 4 and 5 were all observed to be isolated high-amplitude features that were not directly attributed to visible objects at the ground surface. Additionally, Anomaly 6 was observed to be at the location of the suspected vent pipe on the east side of the building. These features were investigated further by GPR.

Discussion of GPR Results

Figure 3 presents the locations of the formal GPR transects performed at the property, as well as the transect images. A total of five GPR transects were performed at the site. GPR Transects 1-2 were performed across EM Anomaly 6 on the east side of the building. These transects showed an isolated hyperbolic reflector and a discreet lateral reflector that are characteristic of a metal UST. The combined EM and GPR data, as well as the observed vent pipe, result in this feature being classified as one probable UST. The probable UST

was approximately 8 feet long and 5 feet wide at a depth of approximately 2.5 feet below the ground surface.

Transects 3-4 were performed across EM Anomaly 5 on the east side of the building. These transects showed an isolated hyperbolic reflector and a discreet lateral reflector that are characteristic of a metal UST. The combined EM and GPR data result in this feature being classified as one possible UST. The possible UST was approximately 8 feet long and 5 feet wide at a depth of approximately 2.0 feet below the ground surface.

Figure 4 presents the location of the probable and possible USTs on an aerial photograph along with a ground-level photograph.

GPR Transect 5 was located along the west side of the building across EM Anomaly 1. This transect recorded isolated hyperbolic features which suggested that a possible utility or utilities may cross through this area. No evidence of larger structures such as USTs was observed.

Collectively, the geophysical data recorded evidence of one probable and one possible metallic UST at Parcel 046.

Figure 5 provides an overlay of the geophysical survey area onto the NCDOT MicroStation engineering plans (proposed ROW and easements) for reference.

SUMMARY & CONCLUSIONS

Pyramid's evaluation of the EM61 and GPR data collected at Parcel 046 in Albemarle, North Carolina, provides the following summary and conclusions:

- The EM61 and GPR surveys provided reliable results for the detection of metallic USTs within the accessible portions of the geophysical survey area.
- Several of the EM anomalies were directly attributed to visible cultural features at the ground surface.
- A suspected vent pipe was observed on the east side of the building.

- Two EM features on the east side of the survey area were associated with unknown buried metal, and were investigated further by GPR. One of these features correlated to the location of the suspected vent pipe.
- One EM feature was observed on the west side of the building that was not readily attributed to any visible cultural features, and was also investigated with GPR.
- At the location of the suspected vent pipe, GPR provided evidence of an isolated hyperbolic reflector and discreet lateral reflector that are characteristic of a UST. The combined geophysical data resulted in this feature being classified as one probable metallic UST (center point 1656062.74, 582531.55 North Carolina State Plane NAD83, feet).
- The probable metallic UST was approximately 8 feet long and 5 feet wide at a depth of approximately 2.5 feet below the ground surface.
- A second isolated hyperbolic reflector and discreet lateral reflector were observed directly north of the probable UST. The combined geophysical data at this location resulted in this feature being classified as one possible metallic UST (center point 1656068.88, 582550.15 North Carolina State Plane NAD83, feet).
- The possible metallic UST was approximately 8 feet long and 5 feet wide at a depth of approximately 2.0 feet below the ground surface.
- GPR performed across the west side of the building did not record any evidence of additional USTs.
- Collectively, the geophysical data recorded evidence of one probable and one possible metallic UST at Parcel 046.

LIMITATIONS

Geophysical surveys have been performed and this report was prepared for F&R in accordance with generally accepted guidelines for EM61 and GPR surveys. It is generally recognized that the results of the EM61 and GPR surveys are non-unique and may not represent actual subsurface conditions. The EM61 and GPR results obtained for this project have not conclusively determined the definitive presence or absence of metallic USTs, but

the evidence collected is sufficient to result in the conclusions made in this report. Additionally, it should be understood that areas containing extensive vegetation, reinforced concrete, or other restrictions to the accessibility of the geophysical instruments could not be fully investigated.

N

APPROXIMATE BOUNDARIES OF GEOPHYSICAL SURVEY AREA

View of Survey Area
(Facing Approximately West)

View of Suspected Vent Pipe
On East Side of Building

TITLE
PARCEL 046 - GEOPHYSICAL SURVEY
BOUNDARIES AND SITE PHOTOGRAPHS

PROJECT
PARCEL 046
ALBEMARLE, NORTH CAROLINA
NCDOT PROJECT R-2530B

PYRAMID GEOPHYSICS
503 INDUSTRIAL AVENUE
GREENSBORO, NC 27460
(336) 335-3174 (p) (336) 691-0648 (f)
License # C1251 Eng. / License # C257 Geology

DATE 8/24/2017

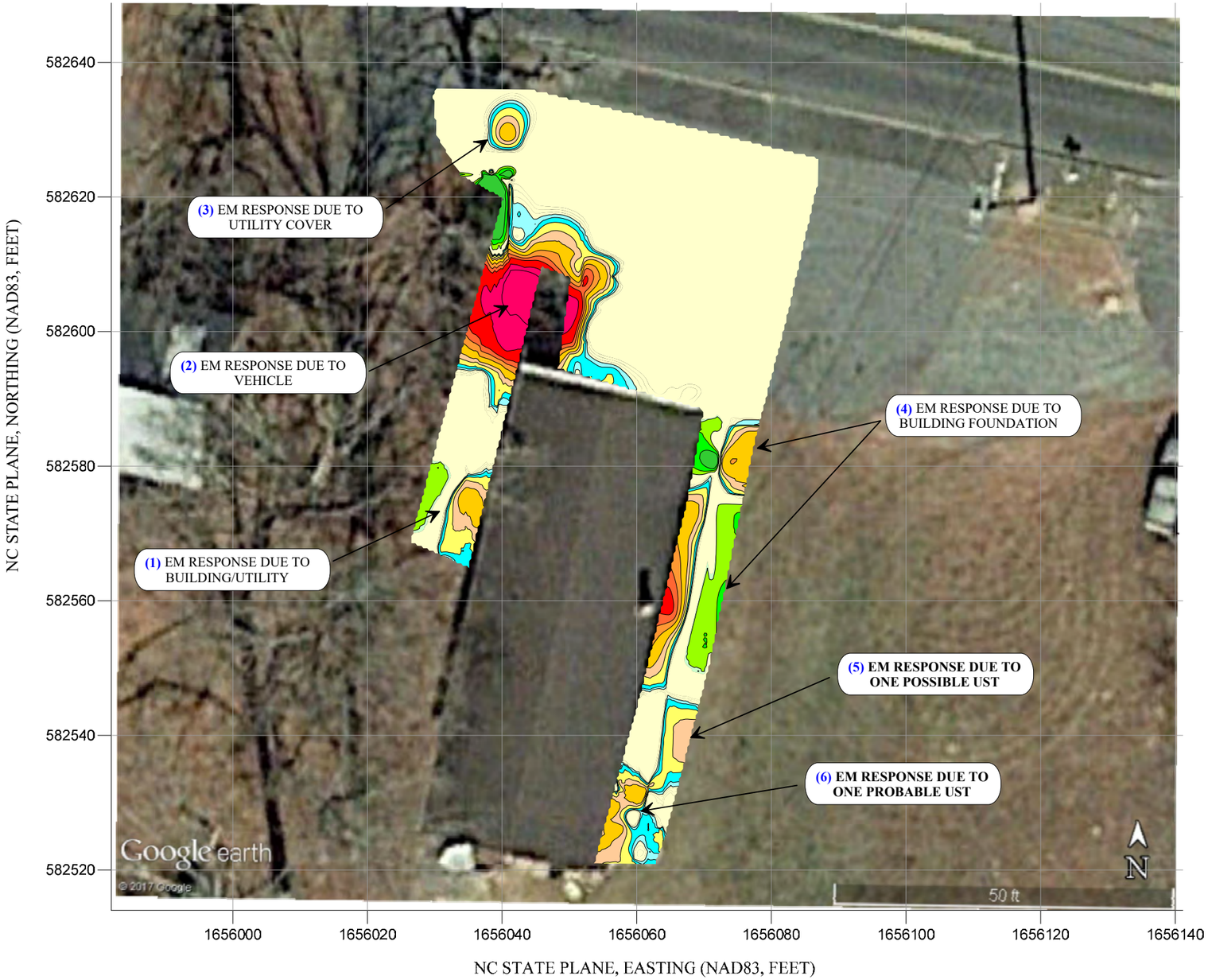
CLIENT
FROEHLING & ROBERTSON

PYRAMID PROJECT #: 2017-203

FIGURE 1

N

EM61 METAL DETECTION RESULTS



EVIDENCE OF ONE PROBABLE AND ONE POSSIBLE METALLIC UST OBSERVED.

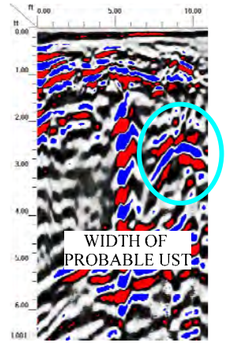
The contour plot shows the differential results of the EM61 instrument in millivolts (mV). The differential results focus on larger metallic objects such as USTs and drums. The EM61 data were collected on July 21, 2017, using a Geonics EM61 instrument. Verification GPR data were collected on July 24, 2017, using a GSSI UtilityScan DF unit with a dual frequency 300/800 MHz antenna.

EM61 Metal Detection Response (millivolts)

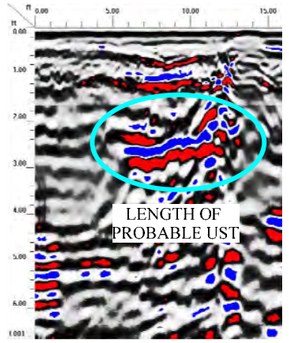
TITLE	PARCEL 046 - EM61 RESULTS CONTOUR MAP
PROJECT	PARCEL 046 ALBEMARLE, NORTH CAROLINA NCDOT PROJECT R-2530B
PYRAMID GEOPHYSICS	503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology
DATE 8/24/2017	CLIENT FROEHLING & ROBERTSON
PYRAMID PROJECT #: 2017-203	**FIGURE 2**

N

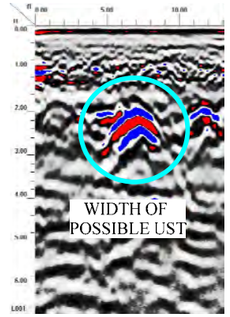
GPR TRANSECT LOCATIONS



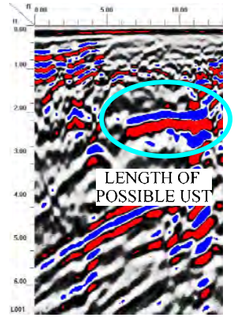
GPR TRANSECT 1 (T1)



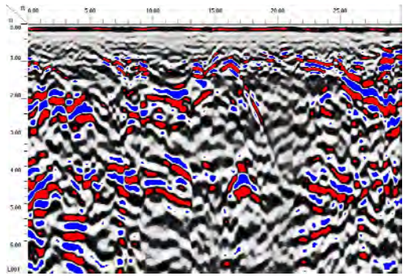
GPR TRANSECT 2 (T2)



GPR TRANSECT 3 (T3)



GPR TRANSECT 4 (T4)

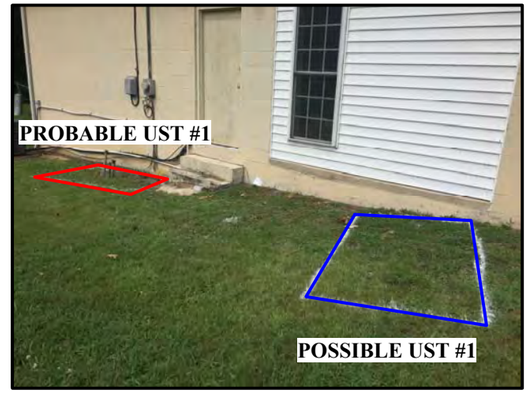


GPR TRANSECT 5 (T5)

TITLE	PARCEL 046 - GPR TRANSECT LOCATIONS AND IMAGES
PROJECT	PARCEL 046 ALBEMARLE, NORTH CAROLINA NCDOT PROJECT R-2530B
PYRAMID GEOPHYSICS	503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology
DATE: 8/24/2017	CLIENT: FROEHLING & ROBERTSON
PYRAMID PROJECT #: 2017-203	**FIGURE 3**

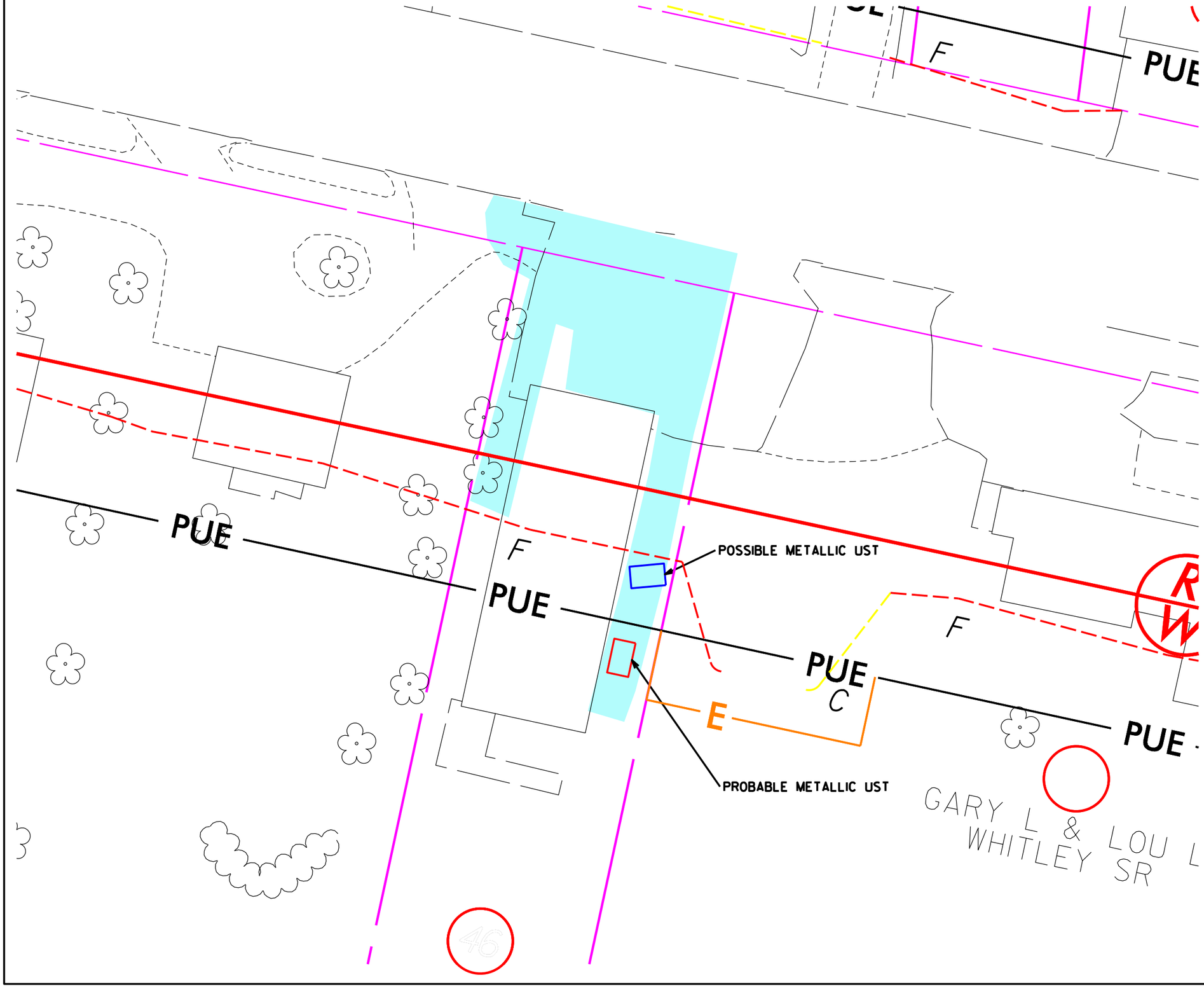
N↑

LOCATION OF PROBABLE AND POSSIBLE METALLIC USTs



View of Probable UST #1
and Possible UST #1
Facing Approximately West

TITLE: PARCEL 046 - LOCATIONS AND SIZES OF PROBABLE/POSSIBLE USTs	
PROJECT: PARCEL 046 ALBEMARLE, NORTH CAROLINA NCDOT PROJECT R-2530B	
PYRAMID GEOPHYSICS — 503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology	
DATE: 8/3/2017	CLIENT: FROEHLING & ROBERTSON
PYRAMID PROJECT #: 2017-203	**FIGURE 4**



LEGEND

- EXISTING ROW
- EXISTING PROPERTY BOUNDARY
- PROPOSED ROW LINE
- TEMPORARY CONSTRUCTION EASEMENT
- PROPOSED PERMANENT DRAINAGE
- PROPOSED PERMANENT UTILITY
- PROPOSED SS CUT LINE
- PROPOSED SS FILL LINE
- GEOPHYSICAL SURVEY AREA
- PROBABLE METALLIC UST
- POSSIBLE METALLIC UST

0 15 30
FEET

N

TITLE: OVERLAY OF GEOPHYSICAL SURVEY BOUNDARIES AND PROBABLE/POSSIBLE UST LOCATIONS ON NCDOT ENGINEERING PLANS

PROJECT: PARCEL 046
ALBEMARLE, NORTH CAROLINA
NCDOT PROJECT R-2530B

PYRAMID GEOPHYSICS
503 INDUSTRIAL AVENUE
GREENSBORO, NC 27406
336.335.3174 (p) 336.691.0648 (f)
License # C1251 Eng. / #C257 Geology

DATE: 8-24-17	REVISION NO. 0
PYRAMID PROJECT NO. 2017-203	FIGURE NO. 5

APPENDIX III

SITE PHOTOS

Photo #1: Boring location B-1, facing south.

Photo #2: Boring locations B-2, B-3, and B-4, facing south.

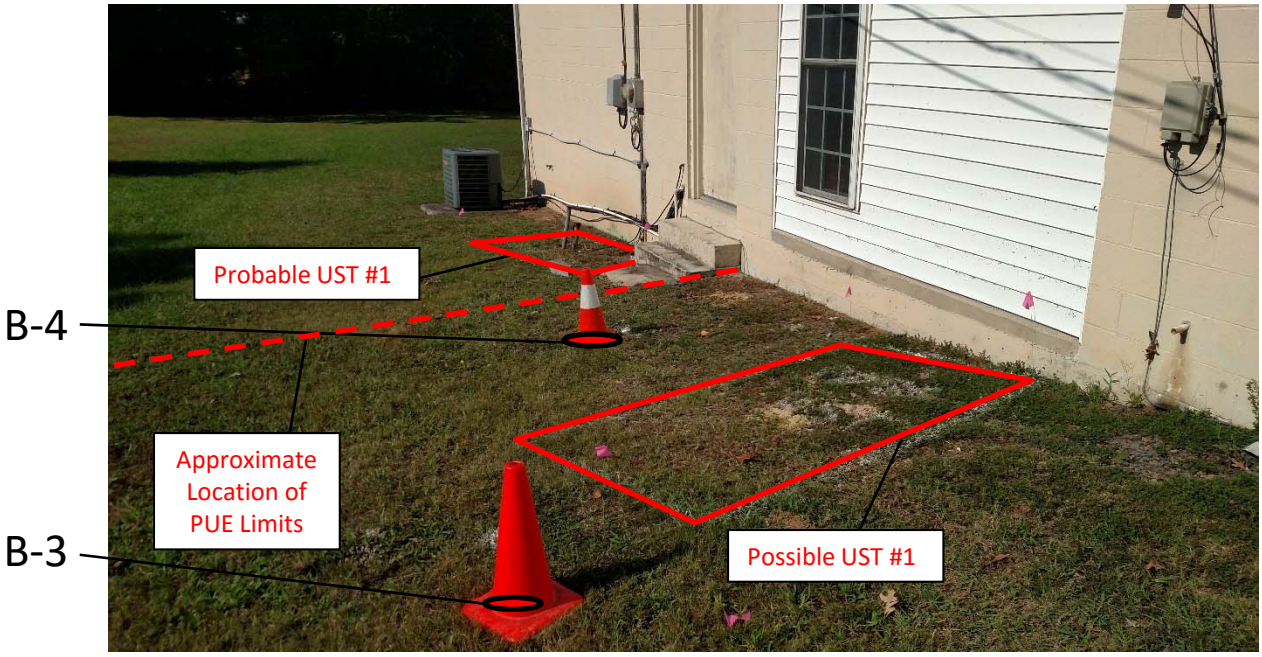


Photo #3: Boring locations B-3, B-4, and a possible and probable UST located just east of the building, facing southwest.

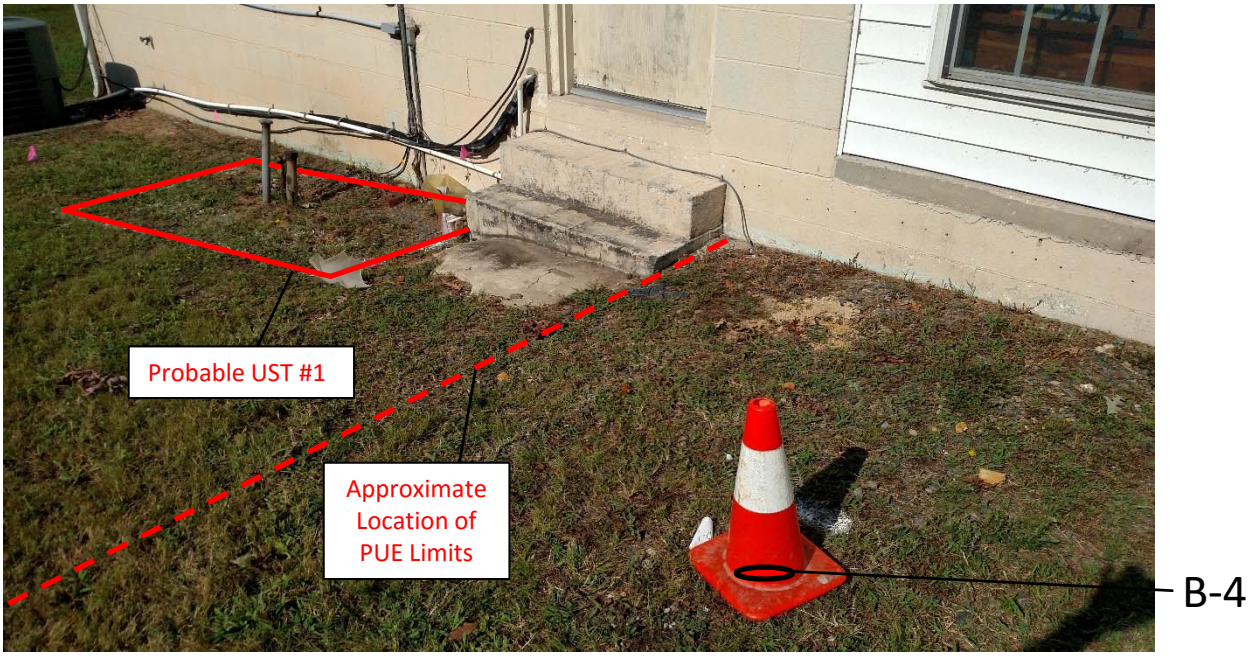


Photo #4: Boring location B-4 and a probable UST located just east of the building and south of B-4, facing southwest.

APPENDIX IV

GEOPROBE LOGS

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: P046 B-1 (1 of 1)

Project No: 66V-0092
Client: NCDOT
Project: R2530B PSAs
City/State: ALBEMARLE, NC

Elevation: EXISTING
Total Depth: 6.5'
Boring Location: SEE BORING LOCATION PLAN

Drilling Method: DIRECT PUSH
Hammer Type: Automatic
Date Drilled: 8/10/17
Driller: REGIONAL PROBING

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	PID (ppm)	Remarks
		Moist Brown Silty Sandy Clay				One sample collected for laboratory analysis (4.0-6.5)
	2.0			2.0	1.2	
	4.0	Dry Tan Silty Clay		4.0	0.7	No petroleum odors observed.
	6.5	Geoprobe Boring Terminated by Direct Push Refusal at 6.5 feet.		6.5	2.6	

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: P046 B-2 (1 of 1)

Project No: 66V-0092
Client: NCDOT
Project: R2530B PSAs
City/State: ALBEMARLE, NC

Elevation: EXISTING
Total Depth: 7.0'
Boring Location: SEE BORING LOCATION PLAN

Drilling Method: DIRECT PUSH
Hammer Type: Automatic
Date Drilled: 8/10/17
Driller: REGIONAL PROBING

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	PID (ppm)	Remarks
		Moist Brown Sandy Silty Clay				One sample collectedfor laboratory analysis (0.0-2.0)
	2.0			2.0	3.9	No petroleum odors observed.
	4.0	Dry Tan Silty Clay		4.0	3.5	
	6.0			6.0	3.2	
	7.0	Geoprobe Boring Terminated by Direct Push Refusal at 7 feet.		7.0	3.3	

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: P046 B-3 (1 of 1)

Project No: 66V-0092
Client: NCDOT
Project: R2530B PSAs
City/State: ALBEMARLE, NC

Elevation: EXISTING
Total Depth: 7.0'
Boring Location: SEE BORING LOCATION PLAN

Drilling Method: DIRECT PUSH
Hammer Type: Automatic
Date Drilled: 8/10/17
Driller: REGIONAL PROBING

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	PID (ppm)	Remarks
		Moist Brown Silty Sandy Clay				One sample collected for laboratory analysis (2.0-4.0)
	2.0	Debris in Soil Matrix (Brick)		2.0	3.6	
						No petroleum odors observed.
	4.0	Dry Tan Silty Clay		4.0	3.6	
	6.0			6.0	3.4	
	7.0	Geoprobe Boring Terminated by Direct Push Refusal at 7 feet.		7.0	3.1	

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: P046 B-4 (1 of 1)

Project No: 66V-0092
Client: NCDOT
Project: R2530B PSAs
City/State: ALBEMARLE, NC

Elevation: EXISTING
Total Depth: 6.5'
Boring Location: SEE BORING LOCATION PLAN

Drilling Method: DIRECT PUSH
Hammer Type: Automatic
Date Drilled: 8/10/17
Driller: REGIONAL PROBING

Elevation	Depth	Description of Materials (Classification)	* Sample Blows	Sample Depth (feet)	PID (ppm)	Remarks
		Moist Brown Silty Clay				One sample collected for laboratory analysis (0.0-2.0)
						No petroleum odors observed.
	2.0	Debris in Soil Matrix (Brick)		2.0	3.1	
	4.0	Dry Tan Silty Clay		4.0	2.2	
	6.5	Geoprobe Boring Terminated by Direct Push Refusal at 6.5 feet.		6.5	1.2	

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the second and third increments of penetration is termed the standard penetration resistance, N-Value.

GEOPROBE LOG BORING LOGS.GPJ F&R.GDT 10/16/17

APPENDIX V

LABORATORY ANALYTICAL RESULTS

QED

REDLAB RAPID ENVIRONMENTAL DIAGNOSTICS

QROS

Hydrocarbon Analysis Results

Client: F & R
Address: 310 HUBERT ST
RALEIGH, NC 27603

Contact: BEN WHITLEY

Project: NCDOT - R2530B - P046

Samples taken Thursday, August 10, 2017
Samples extracted Thursday, August 10, 2017
Samples analysed Monday, August 14, 2017

Operator PANTESCO

U04049

Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	% Ratios			HC Fingerprint Match
										C5 - C10	C10 - C18	C18	
s	P046 B1 (4-6.5)	47.3	<1.2	<1.2	3.7	3.7	1.7	<0.38	<0.047	0	76.9	23.1	V.Deg.PHC 92.9%,(FCM)
s	PO46 B2 (0-2)	49.1	<1.2	2.6	16.6	19.2	9.1	<0.39	<0.049	26.2	53.7	20.1	Deg.PHC 93.5%,(FCM),(P)

Initial Calibrator QC check OK

Final FCM QC Check OK 100.7 %

Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values uncorrected for moisture or stone content. Fingerprints provide a tentative hydrocarbon identification.

Abbreviations :- FCM = Results calculated using Fundamental Calibration Mode : % = confidence of hydrocarbon identification : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate detected

B = Blank Drift : (SBS)/(LBS) = Site Specific or Library Background Subtraction applied to result : (BO) = Background Organics detected : (OCR) = Outside cal range : (M) = Modifed Result.

% Ratios estimated aromatic carbon number proportions : HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only. **Data generated by HC-1 Analyser**

QED

AQROS

Hydrocarbon Analysis Results

Client: F & R
Address: 310 HUBERT ST
RALEIGH, NC 27604

Contact: BEN WHITLEY

Project: NCDOT-R2530B-P046

Samples taken Thursday, August 17, 2017
Samples extracted Thursday, August 17, 2017
Samples analysed Friday, August 18, 2017

Operator PANTESCO

U00904

Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	% Ratios			HC Fingerprint Match
										C5 - C10	C10 - C18	C18	
s	P046-B4 (4-6)	21.2	<0.53	<0.53	<0.53	<0.53	<0.11	<0.17	<0.021	0	50.5	49.5	Residual HC,(BO)
s	P046-B3 (6-7)	20.9	<0.52	<0.52	<0.52	<0.52	<0.1	<0.17	<0.021	0	0	100	PHC not detected,(BO)

Initial Calibrator QC check OK

Final FCM QC Check OK 102.4 %

Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values uncorrected for moisture or stone content. Fingerprints provide a tentative hydrocarbon identification.

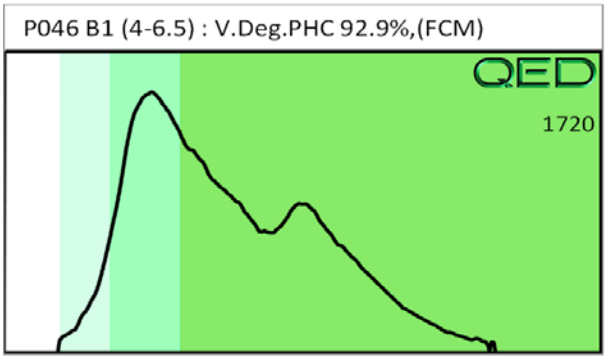
Abbreviations :- FCM = Results calculated using Fundamental Calibration Mode : % = confidence of hydrocarbon identification : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate detected

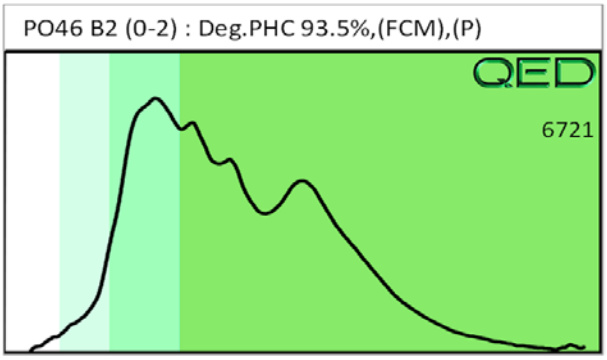
B = Blank Drift : (SBS)/(LBS) = Site Specific or Library Background Subtraction applied to result : (BO) = Background Organics detected : (OCR) = Outside cal range : (M) = Modifed Result.

% Ratios estimated aromatic carbon number proportions : HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only. **Data generated by HC-1 Analyser**

QED Hydrocarbon Fingerprints

Project: NCDOT - R2530B - P046 Monday, August 14, 2017

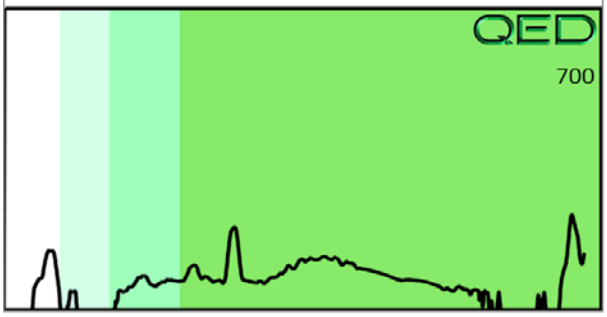




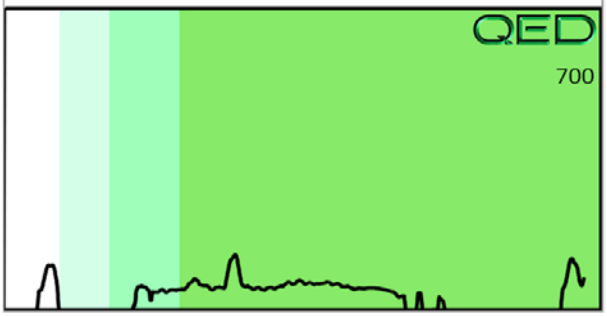
QED Hydrocarbon Fingerprints

Project: NCDOT-R2530B-P046 Friday, August 18, 2017

P046-B4 (4-6) : Residual HC,(BO)



P046-B3 (6-7) : PHC not detected,(BO)



Corporate HQ: 3015 DUMBARTON ROAD RICHMOND, VIRGINIA 23228 T 804.264.2701 F 804.264.1202 www.fandr.com

VIRGINIA • NORTH CAROLINA • SOUTH CAROLINA • MARYLAND • DISTRICT OF COLUMBIA